

In-Class Worksheet 12: Polynomial Time Reductions and NP Problems

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Give a polynomial time non-deterministic Turing machine and verifier for the following problems

- $\{(G, s, t) \mid G \text{ has a Hamiltonian path from } s \text{ to } t\}$
- $\{n \mid n \text{ is not a prime number}\}$
- $\{(S, t) \mid S \text{ is a set of numbers that has a subset that sums to } t\}$
- $\{(M, w, n) \mid M \text{ is a non-deterministic Turing machine, } w \text{ is a string, and } M \text{ has a computational path that accepts } w \text{ in } n \text{ steps or under}\}$

Is the following language decidable? $\{(x, P) \mid P \text{ is a C-program and } x \text{ is a variable that gets initialized during some execution path}\}$